



III B.Tech II Sem Regular End Examination, June 2022

Design and Analysis of Algorithms
(Computer Science and Engineering)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part – A, answer all questions which carries 20 marks.

3. In Part – B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

PART- A**(10*2 Marks = 20 Marks)**

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|-------|---|----|-----|-----|
| 1. a) | What is the need of Space Complexity | 2M | CO1 | BL3 |
| b) | Define recurrence relation. | 2M | CO1 | BL1 |
| c) | Define Disjoint set. | 2M | CO2 | BL1 |
| d) | Define Chromatic number. | 2M | CO2 | BL1 |
| e) | Define Principle of optimality. | 2M | CO3 | BL1 |
| f) | Write any two application of Binary Search tree. | 2M | CO3 | BL3 |
| g) | Define Spanning tree | 2M | CO4 | BL1 |
| h) | Define Greedy choice property | 2M | CO4 | BL1 |
| i) | What is mean by E-node | 2M | CO5 | BL1 |
| j) | What is the need of non deterministic algorithms? | 2M | CO5 | BL2 |

PART- B**(10*5 Marks = 50 Marks)**

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|---|----|--|----|-----|-----|
| 2 | a) | Define Algorithm. Write the characteristics of an Algorithm. | 5M | CO1 | BL2 |
| | b) | Explain Asymptotic Notations with suitable example. | 5M | CO1 | BL2 |

OR

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|---|--|--|-----|-----|-----|
| 3 | | Write the Quick Sort recursive algorithm. Apply Quick Sort strategy on the following list of number and analyze its time complexity.
99 88 77 66 55 44 33 22 11 | 10M | CO1 | BL4 |
|---|--|--|-----|-----|-----|

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|---|----|---|----|-----|-----|
| 4 | a) | Write the algorithm for Simple union and explain it. | 5M | CO2 | BL2 |
| | b) | Explain collapsing find strategy and its time complexity. | 5M | CO2 | BL3 |

OR

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|---|--|---|-----|-----|-----|
| 5 | | Define state space tree. Explain the sum of subset problem using backtracking strategy and calculate its time complexity. | 10M | CO2 | BL2 |
|---|--|---|-----|-----|-----|

- 6 a) Write the differences between Dynamic Programming and Divide and Conquer algorithms. 5M C03 BL3
 b) Compare and Contrast Tabulation method and memorization methods in dynamic programming. 5M C03 BL3

OR

- 7 Find the minimum cost tour for the following graph using dynamic programming. Costs of edges are given by matrix as shown in the figure1. 10M C03 BL3

0	10	15	20
5	0	9	10
6	13	0	12
8	8	9	0

Figure :1

- 8 a) Write the differences between Prim's and kruskal's algorithms for minimum cost spanning tree. 5M C04 BL3
 b) Write the dijkstra's algorithms to solve Single source shortest path problem. 5M C04 BL2

OR

- 9 Consider the following jobs, deadlines and profits. Use the Job sequence with deadline algorithm to maximize the total profit. 10M C04 BL3

Job	deadline	profit
1	2	40
2	4	15
3	3	60
4	2	20
5	3	10
6	1	45
7	1	55

- 10 a) Define bounding function. Explain it with one suitable example. 5M C05 BL2
 b) State and Prove Cook's theorem. 5M C05 BL2

OR

- 11 Give LCBB Solution for the following knapsack instance $n=4$ $m=15$ $(P_1, P_2, P_3, P_4) = (10, 10, 12, 18)$ and $(W_1, W_2, W_3, W_4) = (2, 4, 6, 9)$ 10M C05 BL3